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ABSTRACT

Desktop video consists of integrating the processing of the video signal in a microcomputer. This definition implies that desktop video can take multiple forms such as virtual editing or digital video. Desktop video, which does not imply any particular technology, has been approached in different ways in different technical fields. It remains a hybrid, ambiguous, and evolving product. While its future in the multimedia market is unclear, it already offers attractive and economical solutions for some problems. Desktop video is especially useful for editing or making small video documents. Editing products and video processing systems are reviewed, with a summary in chart form for the following products: (1) Video Machine; (2) Studio Matrox; (3) Personal Producer; and (4) Sony DES 500. (SLD)

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DESKTOP VIDEO PRODUCTIONS

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DESKTOP VIDEO PRODUCTIONS

The concept of desktop video first appeared on the market through advertisements and articles in technical magazines. It was neither linked to any particular equipment, nor to a new and well-defined technique.

Its appearance does not correspond to the appearance of a new technology such as the Photo-CD or the videodisc, but rather to the integration of various technical elements. until now used separately in the field of video and micro-informatics.

The moderate results of desktop video, resulting from the combination of video and informatics first came from small constructors operating simultaneously in both fields and improving hybrid products.

Not any manufacturer of video equipment or micro-informatics has worked in this field or taken any marketing action in order to make desktop video more popular and giving it its letters patent of mobility.

Desktop video both is a hybrid, ambiguous and evolving product, which is now reaching the point of convergence in the wold of technology.

Although we do not know its future position on the multimedia market, desktop video already offers the user a large number of attractive and economical solutions.

1 Towards a definition of desktop video

In a simple way we can say that desktop video consists of integrating the processing of the video signal in a micro-computer. This definition implies that desktop video can take multiple forms, some of which being more precisely, hence more restrictive, such as the virtual editing or digital video (in the sense of micro-informatics and not broadcast oriented) such as Quicktime, Video for Windows, etc. When we look at the history of desktop video, we notice that desktop video has been simultaneously approached in different ways in different technical fields.

1.1 Different technical approaches

1.1.1 Desktop video seen by Sony : EVO 720

Desktop linked to video first appeared in Sony's documentation on its editing table Video 8 Sony EVO 720 and its successor Hi 8, EVO 9700. Thanks to the size reduction of the tapes and the electronical circuits the equipment needed for video editing and titling no longer takes the size of an ancient

Normandic table (two recorders, their remote control and the corresponding monitors), let alone the essential mass of cables. The new systems only consist of a very small unit regrouping both recorders, a 14-inch control monitor and a titling keyboard, so that the whole looks like a micro-computer rather than like a video production unit. This editing system hence consists of a desktop, at the disposal of users who wish to make a small video document without using a heavy institutional video system.

1.1.2 Video processing cards in a micro-computer

Another evolution towards desktop video is created by the fact that certain Time Base Corrector constructors noticed that TBC's systematically consist of a mechanic unit, electric alimentation and a control panel keyboard, coming close to a computer keyboard. As those systems are only produced on a limited scale, they are very expensive, whereas micro-computer systems continuously reduce in price. Thanks to a recent reduce in size of the integrated circuits, it is now possible to make a TBC which has the size of a removable micro-computer card.

As micro-computers are that common today, several producers now sell TBC cards for micro-computers. The video processings remain on the video card and the video signals do not pass through the micro-computer's mother card. The mother card has only a restricted number of functions, such as the alimentation, the command interface (graphic menu or mouse) and the box. Those cards generally cost 4 000 to 6 000 US $, which, considering the price reductions of micro-computers, makes the total cost of this solution competitive in comparison with those of traditional solutions.

Once the initial difficulties in numeral processing surmounted, the manufacturers were tempted to pass to special effect cards or even to the production. All those manufacturers now offer a complete technical environment of video production (synchronizing generators, video distributors, profile monitors, vector scope, etc.)

1.2 Confusion with virtual editing

Virtual editing, popularized by systems as AVID and their immediate competitors are often confused with desktop video.
The similarity of the tools (micro-computers and recorders) and the methods (video signal processing on micro-computers) facilitates the assimilation between both system categories. Because of the vagueness of desktop video, we are inclined to assimilate the virtual editing systems, - which are far more notorious - to video desktop systems.

But is each desktop video tool, such as Video Machine or Studio by Matrox suitable for virtual editing ? The introduction of digital recording functionalities and non-linear editing on both systems are however only confusing the issue.

Remember that virtual editing firstly consists of digitizing video sequences on computer hard disks in order to edit them by memorizing pointers permitting the non-linear reading of edited sequences according to the editing list. This non-linearity makes direct and instant access possible (random access), only thanks to those pointers, to any image file and/or its location on the hard disk and to carry out any modification (copy, paste, insert), contrary to the "usual" editing systems where sequential searching is needed (preroll).

According to the quality level of the digital recording, the virtual editing system functions either like an off-line editing tool, transferring the editing list towards a more usual video editing system with recorders, or like an on-line editing table with transfert of the final editing on a recorder. Off-line virtual editing systems are one of the clearly defined stages in video production with finalization on a expensive multi-machine video editing table. They are hence reserved for professional productions linked to much money.

1.3 Desktop video is no digital video on micro-computer

Improved performances of micro-computers, the performances of magnetic recording mediums in particular (hard disk) and the extension of operating systems controlling animated images (Quicktime and Indeo) have incited the manufacturers to offer solutions for recordings and video editing on a computer platform. This new field is a component of the large galaxy of digital video. At present, these systems are regrouped under the banner multimedia or digital video. They are often offered by commercial partners who do not belong to the traditional video market. But although those equipments do correspond to the definition of desktop video, this terminology is not used to characterize this new category of systems. We could extrapolate the terms used for their audio equivalent DAW (Digital Audio Workstation) or DDA (Direct to Disk Audio). Other terms can be created and validated in every day use.

Certain equipments, originating from virtual editing, such as Media Suite Pro by AVID have difficulties in defining a new common usual term to indicate the difference with virtual editing. Moreover, the performances and the quality differ from one system or brand to another, and each manufacturer avoids being put in the same unit than any unfavourable brand, circulating in the video world after some failed first tentatives. To caricature the present market situation, we can say that, if users, familiar with micro-computers display an animated sequence on their screen with a 320 x 200 resolution and a rhythm of 5 images/second, and announce that they are close to broadcast quality, the simple term "digital video on micro-computer" makes the video professionals think the worst, as all beautiful images they have made will soon reach the quality of a ten-year-old VHS tape.

To take the heat out of the debate, a classification should be made based on the quality and the size of the images and on the material characteristics required. The extension systems, described and presented in different articles are only a step forward, but they are not enough to come to a right quality level.

A first classification criterion, easily verifiable, is the size of the displayed images, either is the form of a frame (± 160 x 120 pixels), or on 25 % of a screen (320 x 200 pixels) or on a full screen (640 x 480 pixels).

A second criterion to be considered is the speed in which an image is displayed on the screen.

The displaying speed can be measured roughly with the naked eye, but it becomes far more difficult to measure if the values are situated between 15 and 25 images/second.

A third and last classification criterion includes all material characteristics needed to display in Macintosh an animated video sequence on a full screen of 25 images/second, an up-market central unity with 68040 microprocessor, of about 30 Mb RAM, a hard disk of 5400 t/min with a data flow of 5 Mb/sec and an up-market digitalizing video card are needed.
On-line virtual editing systems on the other hand correspond to the definition we could give to define desktop video. We notice however that both on-line virtual editing and desktop video do not cover the same realities and correspond to two different video production tools.

With a low-market virtual unity (LC II) and its standard environment, the sequences read have a format of 160 x 120 pixels and a rhythm of 5 to 10 im/sec.

Although those results are rather poor from the video point of view, they are a real feat of strength thanks to Quicktime.

The number of parameters to be considered and the number of resulting combination not yet allow the creation of a reliable relation between the central unit's performances and the quality of the results obtained.

As to PC's, the output video for Windows allows an evolution of the same kind, with however 12 to 18 months interval compared to Apple. The perspectives opened up by the adjustment of the algorithm of the type MPEG are limited by the frame-coding, excluding each editing possibility. MPEG coding remains the privilege of the digital transmission systems, or of the recorded supports such as the CD-I.

Hence, the only possible progress is confined to the hardware (speed of the microprocessors, hard disk performances,...). That is why the evolution of the performances which we have seen lately covers enormous progress in the field of video recording on micro-computers.

1.4 Separating desktop video and auxiliary editing software

Another category of products to be separated from desktop video are the auxiliary editing software systems, running on micro-computers, the EDL (Edit Decision List) coming from the common editing remote control devices (transfer by port RS-232 from the majority of editing remote control devices), so as to change the editing without any direct link with the images. The work like EDL cleaners or convertors. Each of these software systems has a limited usage and has known a reduced distribution as they are generally linked to a precise hardware system.

1.5 Separating desktop video from editing remote control systems using a micro-computer to store its data

In order to limit the price of an editing system, several editing remote control systems use a micro-computer to store their EDL. This way, an internal diskette reader, with its own operating system and a specific display system are not needed.
The editing system hence includes an electronic box enclosing the connectors, the remote control interfaces to control the recorders and a micro-computer. The micro-computer operates the specific editing software and serves as storage unity for the EDL and as interface between the user and the device via the display screen and the keyboard.
As to us, these systems cannot be classified under desktop video systems as defined above.

1.6 Definition of desktop video

Having eliminated a number of devices in the field of desktop video, we can now come closer to a definition of desktop video. Desktop video is a field of activities in micro-informatics, which, from specific accessories (electronic cards inserted in micro-computers, interface units), allows the processing of video images (special effects, corrections, ...) their mixing and the control of the recorders in order to make a multimedia editing table.
According to the combination of the functions (video mixing, editing, EDL storing, ...) this concept covers a large number of different and varied materials. In this definition video images are not directly stored on the hard disks of the micro-computers, which implies that each virtual or non-linear editing system is excluded. Hence, desktop video can be identified in a very simple way by checking whether the recording supports remain outside the micro-computer.

This definition is however not taken into consideration by any manufacturer or marketing concept. It was established to facilitate the classification of new products. As the market is continuously changing, we will have to adapt this definition later.

2 Product analysis

All desktop video systems are listed and analyzed now. To give a precise survey of desktop video, each product linked directly or indirectly with desktop video is listed too. It will give the reader a complete view of this vague and evolving world. Each product described either functions on a computer or can be linked with a computer. Unless otherwise stated, all systems indicated can be used with a compatible PC (386 or 486 processor, with a ISA bus).

2.1 Editing remote control interfaced with a micro-computer

According to the above-mentioned definition, those products do not belong to desktop video. These systems deal with remote control devices for editing tables linked to general public recorders (VHS, S-VHS, 8 mm, HI-8) which regroup in a separate unit a remote control system for recorders based on a microprocessor. The micro-computer linked to that unit is only used as an EDL storage unit and as an interface between the user and the device to control the system. To avoid specific keyboards overloaded with functions, a computer screen will display many data and lists with editing points.

2.2 Editing remote control on micro-computers

The micro-computer on which a certain programme runs, takes the place of an editing remote control device in a video editing table. The editing itself takes place on the editing recorder linked to the micro-computer and not directly to the micro-computer as is the case in a virtual editing system.
The recorders of the editing table are linked to and directed from the micro-computer either through a serial port RS-232, or through a particular interface card inserted in the computer.
This connection method depends both on the number of recorders controlled (the majority of computers only possess two serial ports), on the features of the serial port and on the remote control protocol.
In certain systems, a digitizing video card is inserted, which allows to display the images of the recorder commanded directly on screen in a separate window.
In certain systems the remote control reads the time-code, hence memorizing the cut-off points. In this way, an EDL is created, which can be memorized and exported by different sophisticated editing remote control EDL's (Sony, BVE, CMX, etc.)
According to the category of connectable recorders, the editing remote control system on computer can be divided into two categories : the system conceived for professional and institutional recorders and the ones for general public recorders.

2.2.1 Institutional and professional editing systems

These systems will control the recorders with RS-422 serial connectors, the standard remote control interface present on each professional and institutional recorders.

2.2.2 General public editing systems

This category covers systems which control general public recorders through the Control L (Sony) or Control M (Panasonic).
Certain products use a micro-computer RS-232 serial port and can control recorders such as AG 5700 (Panasonic) or institutional videodiscs. Finally, certain manufacturers aim at a maximum compatibility by favouring a programmable infrared emitter. This kind of products makes the reading of the RCTC time-code through the LANC port more and more systematically.

2.3 Video processing systems

Several manufacturers offer video processing cards to be inserted in a micro-computer. Initially, it were mainly producers of time base correctors (GML, I-DEN, etc.) who offered their traditional products for other uses. Since then many other producers have followed their example, and now offer a large scale of cards.

As the micro-computer only has a supplying and checking function, some manufacturers now offer independent units for those cards, so that users do not need a computer if they are only interested in video functions which have nothing to do with micro-informatics. Those manufacturers also offer software needed to use the different functions. Several cards generally implies different programmes, which may harm their ergonomics and their efficiency.
From this point of view, a better solution is offered by products regrouping all common functions in the field of processing, video mixing and editing, such as Matrox Studio (Matrox) or Video Machine (Fast Electronic).

2.4 Remote control system with video processing

This category includes upmarket desktop video, as those systems regroup in one single unity a video mixer with digital effects, a multi-machine editing remote control unit with AB/Roll, and a subtitling generator. In this field we find well-known products, even if they are still mixed up with virtual editing systems.
See also survey table.

2.4.1 Video Machine

Pros
- Many functionalities for a low price.
- Mixing of general public and institutional recorders
- Numerous parametric video effects

Cons
- Video effects limited to two planes (or two tracks)
- Limited sound corrections and manipulations
- Rather complex and uncommon title and graphic integration

2.4.2 Studio Matrox

Pros
- High functional system
- Intuitive control of the multi-level video effects
- Easy adjustment of the keyers
- Mixing possibilities and sound processing

Cons
- Rather complex interfacing, resulting from the high functionalities

2.4.3 Personal Producer (Matrox)

Pros
- Numerous functionalities (subtitling, digital effects, ...) in a video cut editing-table
- Additional software possibilities (subtitling, graphism, ...)
- Sound processing through an additional audio card

Cons
- A number of limits caused by the structure of a two-device video cut editing table
- No external EDL transferts possible

2.4.4 Sony DES 500

Pros
- Dynamic frame control
- Better and preciser graphic interface
- Combination possibilities with other Sony products

Cons
- No integration possibilities of graphic computer elements
- No subtitling software

Survey

	Video Machine	Studio Matrox	Personal Producer	Sony DES 500
Minimum equipment	PC 386 DX 33 Mhz 8Mb RAM, 80Mb DD		PC 386 4Mb RAM, 40Mb DD	
Recommended equipment	PC 486 33Mhz 16Mb RAM 200Mb DD or Mac II, Centris, Quadra 20Mb RAM 160Mb DD + QuikTime	PC 486 DX 33Mhz 12Mb RAM 500Mb DD	PC 486 DX 8Mb RAM, 80Mb DD	PC 486 66Mhz 8Mb RAM 340Mb DD CD-ROM
Configuration	1 card ISA	5 cards port EISA	1 card ISA and the recorders control box	Box DFS 500 Recorder control Audio Processor
Number of controlable recorders	3	4 + 4 in option	2	4 + 2 in option
Remote control interface	Control L, Control M, RS-232, RS-422 Ctrl. Box	RS-232 or RS-422	RS-232 or RS-422	RS-422
Number of video inputs	6 composite or Y/C, 2 composed with Ctrl. Box	8 composite or 4 Y/C or 3 composed in option	2 composite or Y/C	4 composite, Y/C or composed
Video standard	PAL, SECAM, NTSC	PAL, NTSC	PAL, NTSC	PAL
Number of video planes	2	3	1	2
Insertion possiblity	yes, 1 Keyer	yes, 2 Keyers	yes, 1 Keyer	yes, 2 Keyers
DVE 2D	yes, 2	yes, 3	yes, 1	s, 1
DVE 3D	no	in option	no	yes
Subtitling possibility	with drawing software or word processing	with software Inscriber	with hardware Inscriber	extern generator
Drawing software	no	Tempra Pro	Pempra Pro	no
Video recording on DD	in option	in option	optional audio card	6
Number of audio imputs	8	12	optional audio card	6
Recording audio on DD	no	yes	audio card in option	no
Time Code	VITC, LTC, Ctrl. Box	yes	yes	yes
EDL export	CMX, Sony	CMX in option	no	CMX, Sony, GVG
Micro-computer supplied	no	yes	no	yes
Basic price (taxes included)	5600 - 7000 US $ Ctrl. Box 3800 US $	38000 - 59000 US $ depends the options	5000 US $ with card, software and control box	43000 US $ for the whole configuration (without monitors and recorders)